

### Abstract of the Disclosure

Novel catalysts and processes in accordance with the invention can accomplish high selectivity and conversion of naphthalenic compounds such as the conversion of methylnaphthalene (2-MN) or naphthalene to 2,6-dimethylnaphthalene (2,6-DMN). The catalysts are prepared by treating, for example, a ZSM-5-type material with iron in the presence of a halogen such as a fluoride. The resulting catalyst includes iron, as well as a significant portion of aluminum present in the ZSM-5-type starting material. Processes for using the catalysts also are disclosed.